Reviewer's report

Title: Analysis of the effectiveness of interventions used during the 2009 H1N1 influenza pandemic

Version: 1 Date: 27 November 2009

Reviewer: ANGELOS HATZAKIS

Reviewer's report:

-Major Compulsory Revisions

1. General comment: As there are numerous papers on this topic (impact of interventions on influenza spread), the authors should stress more clearly what is novel in their analysis (e.g. the assumption of an R0 similar to that of the current pandemic whereas previous papers usually assumed higher values?)

2. page 5, first paragraph: A very important study is missing here (Halloran, Ferguson, Eubank et al. Modeling targeted layered containment of an influenza pandemic in the United States. PNAS, 2008) which is the most complete in terms of assessed intervention scenarios and models used. In this paper, the choice of threshold for initiating e.g. treatment or school closure is analysed in detail. A further paper that should be included is by Sypsa and Hatzakis (School closure is currently the main strategy to mitigate novel influenza A (H1N1): A modeling study. Euro Surveill, 2009) where the impact of treatment, prophylaxis and school closure was explored with an individual-based stochastic model that was set up to simulate the exact epidemiological characteristics of the H1N1 pandemic using the age-specific attack rates and R0 of the outbreak in La Gloria - Mexico (in contrast to the other papers in your references where simulations where based on assumptions concerning hypothetical epidemiological characteristics of a future pandemic). There is also a very recent paper that you should include in the discussion of your paper as it deals with a similar topic in the setting of Japan (Yasuda & Suzuki, Eurosurveillance, 2009).

3. Page 8: Is the mean generation time predicted by the model under the assumptions you employed concerning the duration of the latent and the infectious period consistent with the estimates provided for influenza A/H1N1?


5. Page 10, paragraphs on school closure scenarios: Have you assumed a 100% compliance of children staying at home during school closure? If yes, this should be stated clearly and discussed in relation to the “contact behavior of pupils when school closure is in effect” that you mention on page 23. Is school closure effective as soon as the first infected cases appear within the community? How
many schools are there in the model community?

6. Discussion Too lengthy

7. Page 20 and Table 4: I would recommend removing this paragraph and the associated table as it is not advisable to extend these findings to countries with different age/household structure. Anyway, table 4 can be inferred easily from table 3 for whatever population size.

8. Page 21, 1st paragraph: According to Glass & Barnes (Epidemiology, 2007), school closure is more effective when Ro is low and attack rates in children are high in comparison to adults. What are the age-specific attack rates predicted by your model in the absence of intervention?

- Minor Essential Revisions

9. Page 7, 5th line from the bottom: “... was increased” instead of “... was increase”

10. Page 16, bottom: It would be better to provide the details and the formula for estimating cases prevented/antiviral course in the “Methods” of the manuscript

11. Page 21, 2nd line: “rather than that” instead of “rather that that”

12. Figures 3-5: Specify in the title of x-axis that it is individual school closure

- Discretionary Revisions

13. page 3, Background: The number of laboratory confirmed cases and deaths (in Australia and worldwide) should be updated

14. page 4, first 2 lines: Estimates for R0 have been provided by other papers too, in particular for countries in the Southern hemisphere and Japan. The range of some of these estimates is higher than the range you report although most studies include the initial estimate of 1.5 provided by Fraser and employed in your model. The choice of R0 should be discussed briefly along with these references as it is a relatively low estimate for a future pandemic influenza.

15. Page 10, paragraphs on “school case isolation with close contact group”: Isn’t the assumed duration of isolation very large (up to 4 weeks) in this particular scenario?

16. Page 11, paragraph on “All school closure”: When is this strategy triggered?

17. Page 11, 4th paragraph: Are all treated cases assumed to stay at home during that period? When are they assumed to start receiving antiviral treatment? I guess one day after developing symptoms since you mention on page 19 that diagnosis occurs 24 hrs post symptoms appearance. This should be added on page 11 too where you describe the treatment scenario.

18. Page 11, 5th paragraph: When do household contacts receive prophylaxis? On the same day the infected case starts receiving treatment?

19. Page 13, bottom: Please include in the sentence where you mention the characteristics of an epidemic with an R0 of 1.5 that they apply in a population with a specific structure (age distribution, household size etc).
20. Page 18, 3d line of the 2nd paragraph: At least in the case of the 1st outbreak in Japan, school closure was found to reduce the effective reproduction number below 1 (Nishiura et al, Eurosurveillance, June 2009).

21. Page 21, last paragraph: The paper by Sypsa & Hatzakis (EuroSurveil 2009) on the use of antivirals during the current pandemic should be included as it is comparable to your analysis in terms of the epidemiological characteristics of the simulated pandemic.

22. Page 23, 3d line: add also the reference Cauchemez et al (Lancet Inf Diseases)

23. Page 24, 1st line: It should be noted though that the estimated reduction is approx 50% (from 37.2% to 23.4%, still much higher than seasonal influenza levels). Furthermore, issues concerning resistance might weaken this argument.

24. Page 30, Table 3: When R0=1.6: RAV under the T+H+E=45.8 and under the T+H+E+ISC RAV presents almost no reduction (44.8). Is this correct?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

Both reviewers declare that they have no competing interests'